CLAIMS

1. A recording head comprising:

a plurality of nozzles for ejecting a fluid;

a plurality of pressure-applied chambers arranged in a predetermined direction and each communicating with a corresponding one of the nozzles; and

a common chamber having a plurality of wall surfaces and configured to supply the fluid to the pressure-applied chambers,

at least one of the wall surfaces of the common chamber, along the predetermined direction, having a pressure absorbing surface with a rigidity lower than those of other wall surfaces and configured to absorb a pressure change,

said pressure absorbing surface being formed by a pressure absorbing member having a non-uniform thickness.

2. The recording head as claimed in claim 1, wherein the pressure absorbing surface is divided into a central portion and two end portions on both sides of the central portion along the predetermined direction, and an average thickness of the pressure absorbing member at the central portion is larger than an average thickness of the pressure absorbing member at the end portions.

3. The recording head as claimed in claim 1, wherein the pressure absorbing member has a thin portion and a thick portion having at least two kinds of thicknesses.

4. The recording head as claimed in claim 3, wherein the thick portion is provided at a central portion of the pressure absorbing member along the predetermined direction, and the thin portion is provided on both sides of the central portion of the pressure absorbing member along the predetermined direction.

5. The recording head as claimed in claim 3, wherein the pressure absorbing member has a stacked structure made up of a plurality of layers, and a number of layers of the stacked structure forming the thin portion is different from a number of layers of the stacked structure forming the thick portion.

6. The recording head as claimed in claim 3, which satisfies a relationship

$$2 \times 10^{10} < Ud^2 \times Uy^{-2.5} \times Ux^{-3.5} \times E^{2/3} < 9 \times 10^{10}$$

where Ud (m) denotes a thickness of the thin portion, Uy (m) denotes a length of the thin portion along a direction perpendicular to the predetermined direction, Ux (m) denotes a length of the thin portion 22 the predetermined direction, and

E (Pa) denotes a Young's modulus of the thin portion.

7. The recording head as claimed in claim 1, wherein the pressure absorbing member has a Young's modulus of 100 MPa or greater.

8. The recording head as claimed in claim 1, wherein the pressure absorbing member is made of nickel.

9. The recording head as claimed in claim 3, which satisfies a relationship

$$0.25 < Ux/Tx < 0.45$$

where Ux (μm) denotes a length of the thin portion along the predetermined direction X and Tx (μm) denotes a total length of the pressure absorbing member along the predetermined direction.

10. The recording head as claimed in claim 2, wherein the end portions of the pressure absorbing member includes a second thick portion provided in a portion thereof.

11. The recording head as claimed in claim 10, wherein the thick portion and the second thick portion of the pressure absorbing member have the same thickness.

12. The recording head as claimed in claim 1, further comprising:

a vibration plate forming at least one surface of the pressure-applied chambers,

wherein a layer forms said vibration plate and at least a portion of the pressure absorbing member.

13. A line type recording head comprising a recording head as claimed in claim 1.

14. A recording head comprising:

a plurality of nozzles for ejecting a fluid;

a plurality of pressure-applied chambers arranged in a predetermined direction and each communicating with a corresponding one of the nozzles;

a common chamber having a plurality of wall surfaces and configured to supply the fluid to the pressure-applied chambers; and

a plurality of pressure converting means for varying pressures within the pressure-applied chambers,

at least one of the wall surfaces of the common chamber, along the predetermined direction, having a pressure absorbing surface with a rigidity lower than those of other wall surfaces and configured to absorb a pressure change,

said pressure absorbing surface being formed by a

pressure absorbing member having a plurality of portions with different rigidities.

15. A line type recording head comprising a recording head as claimed in claim 14.

16. A carriage comprising:

a recording head as claimed in claim 1; and

a fluid cartridge configured to supply the fluid to the recording head.

17. A carriage comprising:

a recording head as claimed in claim 14; and

a fluid cartridge configured to supply the fluid to the recording head.

18. An image forming apparatus comprising:

a recording head as claimed in claim 1;

a fluid cartridge configured to supply the fluid to the recording head; and

a cartridge, accommodating the recording head and the fluid cartridge, configured to move in a main scan direction which is perpendicular to the predetermined direction.

19. An image forming apparatus comprising:

a recording head as claimed in claim 1;

a fluid cartridge configured to supply the fluid to the recording head; and

a cartridge, accommodating the recording head and the fluid cartridge, configured to move in a main scan direction which is perpendicular to the predetermined direction.

20. A recording head comprising:

a plurality of nozzles for ejecting a fluid;

a plurality of pressure-applied chambers arranged in a predetermined direction and each communicating with a corresponding one of the nozzles;

a common chamber having a plurality of wall surfaces and configured to supply the fluid to the pressure-applied chambers; and

a plurality of pressure converting means for varying pressures within the pressure-applied chambers,

at least one of the wall surfaces of the common chamber, along the predetermined direction, having a damping surface with a rigidity lower than those of other wall surfaces and configured to absorb a pressure by vibration,

said damping surface being formed by a pressure absorbing member which partially has a region where no damping surface is formed, such that the damping surface extends for a length along the predetermined direction less than a total length of

the common chamber along the predetermined direction.

21. The recording head as claimed in claim 20, wherein the pressure absorbing member has a continuous surface forming the damper surface.

22. The recording head as claimed in claim 20, wherein the region is arranged on both ends of said at least one of the wall surfaces of the common chamber along the predetermined direction.

23. The recording head as claimed in claim 20, wherein:

at least a portion of wall surfaces forming the pressure-applied chambers has a rigidity lower than the other wall surfaces to form a vibration plate of the pressure converting means, and

both the vibration plate and the damper surface are formed by a common first layer.

24. The recording head as claimed in claim 23, further comprising:

a second layer partially formed on the common first layer and forming the region,

said common first layer extending in the predetermined

direction and forming the damper surface by a surface thereof not having the second layer formed thereon.

25. The recording head as claimed in claim 20, wherein the damper surface has an elasticity lower than those of the other wall surfaces of the common chamber.

26. The recording head as claimed in claim 20, wherein an elasticity Gd (Pa) of the pressure absorbing member forming the damper surface satisfies a relationship

$$1.0 \times 10^{-13} < Lx^{-1} \times Ldx \times Ldy \times Td^{-0.3} \times Gd^{-1} < 2.0 \times 10^{-13}$$

where Lx (m) denotes a length of the common chamber along the predetermined direction, Ldx (m) denotes a length of the damper surface of the pressure absorbing member along the predetermined direction, Ldy (m) denotes a length of the damper surface of the pressure absorbing member along a direction perpendicular to the predetermined direction, and Td (m) denotes a thickness of the pressure absorbing member forming the damper surface.

27. A carriage comprising:

a recording head as claimed in claim 20; and

a fluid cartridge configured to supply the fluid to the recording head.

28. An image forming apparatus comprising:

a recording head as claimed in claim 20;

a fluid cartridge configured to supply the fluid to the recording head; and

a cartridge, accommodating the recording head and the fluid cartridge, configured to move in a main scan direction which is perpendicular to the predetermined direction.

29. A recording head comprising:

a plurality of nozzles for ejecting a fluid;

a plurality of pressure-applied chambers arranged in a predetermined direction and each communicating with a corresponding one of the nozzles; and

a common chamber having a plurality of wall surfaces and configured to supply the fluid to the pressure-applied chambers,

at least one of the wall surfaces of the common chamber having a free vibration surface having thick portions and thin portions.

30. The recording head as claimed in claim 29, wherein a member forming the free vibration surface integrally forms a surface of the pressure-applied chamber.

31. The recording head as claimed in claim 29,

wherein a member forming the free vibration surface has a stacked structure made up of a plurality of stacked layers.

32. The recording head as claimed in claim 30, wherein the thick portions have a thickness equal to a thickness of a member forming a wall surface of the pressure-applied chamber.

33. The recording head as claimed in claim 29, wherein the thin portions are arranged in vicinities of a portion of the free vibration surface where a width of the free vibration surface along a direction perpendicular to the predetermined direction narrows compared to other portions.

34. The recording head as claimed in claim 29, wherein the thin portions are arranged in vicinities of a portion of the common chamber where a cross sectional area of the common chamber cut along a direction perpendicular to the predetermined direction decreases compared to other portions.

35. The recording head as claimed in claim 29, wherein a cross sectional area of the common chamber cut along a direction perpendicular to the predetermined direction decreases towards an end portion of the common chamber along the predetermined reaction.

36. A carriage comprising:

a recording head as claimed in claim 29; and

a fluid cartridge configured to supply the fluid to the recording head.

37. An image forming apparatus comprising:

a recording head as claimed in claim 29;

a fluid cartridge configured to supply the fluid to the recording head; and

a cartridge, accommodating the recording head and the fluid cartridge, configured to move in a main scan direction which is perpendicular to the predetermined direction.